

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-170128

(43)Date of publication of application : 26.06.2001

(51)Int.Cl.

A61H 23/02

A61N 1/06

A61N 1/32

(21)Application number : 11-364324

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(22)Date of filing : 22.12.1999

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## (54) WEIGHT REDUCING APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a weight reducing apparatus which can efficiently reduce the weight of the user by effectively activating the uncoupling protein family.

SOLUTION: The weight reducing apparatus is provided with a physical stimulating means which is used to activate the uncoupling protein family that works to generate heat by physically stimulating the family and, at the same time, to generate and radiate heat. Consequently, the apparatus can effectively stimulate the uncoupling protein family by a physical stimulus.

### Claim(s)

[Claim 1] A lean figure instrument which possesses a physical stimulation means for stimulating physically an uncoupling protein family who considers a heat production as work, and making it activated, and making heat produce and radiate heat, and is characterized by things.

[Claim 2] The lean figure instrument according to claim 1 with which a physical stimulation means is characterized by being an ultrasonic wave, high frequency, medium frequency, a low frequency wave, vibration, warm temperature, cooling, electrical and electric equipment, \*\*, and a thing on which massage, and rub and at least one of the beats is made to act to a part which gives a stimulus.

[Claim 3] The lean figure instrument according to claim 1 or 2, wherein a physical stimulation means is what stimulates at least one of the uncoupling protein families who exist in a brown fat cell, white fat cells, and skeletal muscle which exist in the scapula lower part, regio axillaris, and

a back cervix at least.

[**Claim 4**] The lean figure instrument according to claim 1 or 2, wherein a physical stimulation means is what stimulates selectively an uncoupling protein family of a part who wants to become thin.

[**Claim 5**] The lean figure instrument according to claim 1 or 2, wherein a physical stimulation means is what stimulates selectively at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least.

[**Claim 6**] A physical stimulation means to stimulate selectively an uncoupling protein family of a part who wants to become thin, The lean figure instrument according to claim 1 or 2 which possesses a physical stimulation means to stimulate at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least, and is characterized by things.

[**Claim 7**] A physical stimulation means to stimulate selectively an uncoupling protein family of a part who wants to become thin, An uncoupling protein family of a part who wants to possess a physical stimulation means to stimulate at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least, and to become thin, The lean figure instrument according to claim 6 changing as at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least is stimulated simultaneously.

### **Detailed Description of the Invention**

[0001]

[**Field of the Invention**] This invention relates to the lean figure instrument which can give physical stimulation to the body and can acquire the lean figure effect.

[0002]

[**Description of the Prior Art**] What gave physical stimulation, such as an ultrasonic wave, low frequency wave electrical and electric equipment, high frequency electrical and electric equipment, \*\*, roller vibration, and warm temperature, to the body is variously provided from the former as a lean figure instrument. However, no these conventional lean figure instruments are the things based on the principle principle of lean figure, There were many what movement for increasing a metabolic amount is merely made only, and things which also have an unknown effect of lean figure and which cannot move a superfluous fat to other parts temporarily, and can expect only the increase in few metabolic amounts.

[0003]Originally, it is the purpose to lessen the excessive fat accumulated in the inside of the body, or to make it an appropriate value, therefore the lean figure must make fat have to melt into blood from superfluous fat cells first (this is called lipolysis), and must burn the fat with muscles. In order to burn a fat efficiently, quantity of motion and movement time must be increased and it must carry out raising a metabolic amount or increasing an individual basal metabolic rate in everyday life etc. That is, from consumption energy, energy consumption can be increased and lean figure can be carried out as a result by the pile.

[0004]In order to cause lipolysis to the slimming agent which was in fashion here in recent years, there are many in which an ingredient which makes a noradrenalin secrete directly is contained, and it is almost the case which cannot acquire the lean figure effect if this fat does not burn even if it makes lipolysis cause in this way. Although it is said that the aerobics for 30 minutes or more is required in order to burn a fat, in order for a basal metabolic rate to fall with a peak of the first half of the 20th generation, it becomes difficult to burn a fat efficiently and to carry out lean figure effectively with aging. Even if it eats, while those who cannot grow fat easily exist, it is a fact that there are some persons who grow fat very easily, but it is because this has the large individual difference of a basal metabolic rate and the metabolic amount at the time of activity, and it is sometimes difficult to carry out lean figure also from individual difference.

[0005]On the other hand, these days, development of obesity treatment progresses, the mechanism of obesity is being solved from the field of energy expenditure by an uncoupling protein family's discovery, and it has turned out that the difference in an uncoupling protein family's activity influences a metabolic amount. I am understood also from development of the remedy which this uncoupling protein family exists in a brown fat cell, white fat cells, skeletal muscle, etc., activates an uncoupling protein family, and treats obesity being performed -- to obtain, In order to carry out fat combustion efficiently, it can be said that it is a point of lean figure how an uncoupling protein family is activated.

[0006]

**[Problem(s) to be Solved by the Invention]** This invention is made in view of the above-mentioned point, and it aims at providing the lean figure instrument which can be made to be able to activate an uncoupling protein family effectively and can carry out lean figure efficiently.

[0007]

**[Means for Solving the Problem]** You stimulate physically an uncoupling protein family who considers a heat production as work, and make it activated, and a lean figure instrument concerning Claim 1 of this invention possesses a physical stimulation means for making heat produce and radiate heat.

[0008]An invention of Claim 2 is characterized by being an ultrasonic wave, high frequency, medium frequency, a low frequency wave, vibration, warm temperature, cooling, electrical and electric equipment, \*\*, and a thing on which massage and rub and at least one of the beats is made to act in above-mentioned Claim 1 to a part to which a physical stimulation means gives a stimulus.

[0009]An invention of Claim 3 is characterized by a physical stimulation means being what stimulates at least one of the uncoupling protein families who exist in a brown fat cell, white fat cells, and skeletal muscle which exist in the scapula lower part, regio axillaris, and a back cervix at least in above-mentioned Claim 1 or 2.

[0010]An invention of Claim 4 is characterized by a physical stimulation means being what stimulates selectively an uncoupling protein family of a part who wants to become thin in above-mentioned Claim 1 or 2.

[0011]An invention of Claim 5 is characterized by a physical stimulation means being what stimulates selectively at least one of the uncoupling protein families of a brown fat cell which

exists in the scapula lower part, regio axillaris, and a back cervix at least in above-mentioned Claim 1 or 2.

[0012]A physical stimulation means by which an invention of Claim 6 stimulates selectively an uncoupling protein family of a part who wants to become thin in above-mentioned Claim 1 or 2, A physical stimulation means to stimulate at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least is provided.

[0013]A physical stimulation means by which an invention of Claim 7 stimulates selectively an uncoupling protein family of a part who wants to become thin in above-mentioned Claim 6, An uncoupling protein family of a part who wants to possess a physical stimulation means to stimulate at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least, and to become thin, It changes, as at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least is stimulated simultaneously.

[0014]A physical stimulation means by which an invention of Claim 8 stimulates selectively an uncoupling protein family of a part who wants to become thin in above-mentioned Claim 6, A physical stimulation means to stimulate at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least is provided, After stimulating an uncoupling protein family of a part who wants to become thin, as at least one of the uncoupling protein families of a brown fat cell which exists in the scapula lower part, regio axillaris, and a back cervix at least is stimulated, it changes in predetermined time.

[0015]An invention of Claim 9 is characterized by a physical stimulation means being a thing which stimulates the sympathetic nerve of a part which wants to become thin, and makes a catecholamine secrete in either of the above-mentioned Claims 1-8.

[0016]In either of the above-mentioned Claims 1-9 an invention of Claim 10, At the same time a physical stimulation means causes lipolysis of a white fat via secretion of a catecholamine from a sympathetic nerve ending and adrenal medulla, It is characterized by being an ultrasonic wave which makes free fatty acid which caused activation of an uncoupling protein family of a white fat and skeletal muscle, and was produced in lipolysis of a white fat diffuse as heat locally.

[0017]

**Embodiment of the Invention** Hereafter, an embodiment of the invention is described.

[0018]In order to attain the purpose of lean figure, it is necessary to disassemble a fat with the superfluous body and to burn this disassembled fat further.

[0019>About lipolysis, it can carry out by making a catecholamine secrete. By carrying out physical stimulation of the sympathetic nerve of the part which a catecholamine is [ part ] a general term for three substances, dopamine, a noradrenalin, and adrenalin, and wants to become thin among the bodies by a physical stimulation means, A catecholamine can be made to secrete from a sympathetic nerve ending or adrenal medulla, and secretion can be promoted. Stimulate the sympathetic nerve by physical stimulation in this way, and it is made to make a catecholamine secrete indirectly, and also chemical irritation substances, such as caffeine and nicotine, are taken or applied externally, and a catecholamine may be made to secrete or it may

be made to promote secretion.

[0020]Here, the example of an experiment which shows that the sympathetic nerve is risen by giving the physical stimulation by an ultrasonic wave using the ultrasonic irradiation implement which has an ultrasonic wave oscillator as a physical stimulation means, and a catecholamine can be made to be able to secrete, and a fat can be disassembled as a result is shown in the graph of drawing 6. The group (ultrasonic group) of six rats which drawing 6 gave the ultrasonic wave of the conditions of 1 MHz and 1 W/cm<sup>2</sup> for 10 minutes, It is what shows the result of having measured change of the amount of free fatty acid in blood, about the group (control group) of six rats which does not give an ultrasonic wave, The amount of free fatty acid is increasing the ultrasonic group intentionally, and it is checked by giving the physical stimulation by an ultrasonic wave that lipolysis can be promoted.

[0021]In order to burn the fat disassembled in this way, in this invention, use a physical stimulation means, and physical stimulation is given to the body, The uncoupling protein family (Uncoupling Protein:UCP) who considers a heat production as work is activated, and he produces heat and is trying to make heat radiate. Existing in the white fat cells whose uncoupling protein families are a brown fat cell which exists in the scapula lower part, regio axillaris, a back cervix, etc. by research of the former [ uncoupling protein family ] although UCP1, UCP2, and UCP3 are known, and a fat said commonly, skeletal muscle, etc. is discovered. Therefore, by carrying out physical stimulation of at least one of the brown fat cell which exists in the scapula lower part, the regio axillaris, and a back cervix at least, white fat cells, and the skeletal muscle in the part which wants to become thin among the bodies, Physical stimulation of at least one of the uncoupling protein families who exist in these can be carried out, and activate an uncoupling protein family, and heat is produced, and heat can be made to be able to radiate, and lean figure can be carried out.

[0022]As a stimulus given to the body in order to activate an uncoupling protein family and to make a catecholamine secrete, they are an ultrasonic wave, the high frequency electrical and electric equipment, the medium frequency electrical and electric equipment, the low frequency wave electrical and electric equipment, vibration, warm temperature, cooling, the electrical and electric equipment, \*\*, and a thing that massage, can rub and can use a beat etc. And the lean figure instrument of this invention is formed as a thing provided with a physical stimulation means to give these ultrasonic waves, the high frequency electrical and electric equipment, the medium frequency electrical and electric equipment, the low frequency wave electrical and electric equipment, vibration, warm temperature, cooling, the electrical and electric equipment, \*\*, and one or more physical stimulation that massages and rubs and is chosen from a beat etc. to the body.

[0023]If an ultrasonic irradiation means is used also in these as a physical stimulation means, the sympathetic nerve will be stimulated by the stimulus by an ultrasonic wave, The lipolysis of white fat cells can be caused via secretion of the catecholamine from a sympathetic nerve ending and adrenal medulla, It can come, simultaneously activation of the uncoupling protein family of white fat cells and skeletal muscle can be caused by the stimulus by an ultrasonic wave, The free fatty acid produced in the lipolysis of white fat cells can be made to be able to diffuse as heat locally by the part which irradiated with the ultrasonic wave, body fat can be

decreased safely, and lean figure can be performed effectively.

[0024]The physical stimulation means of a lean figure instrument gives a stimulus selectively to the part which wants to become thin among the bodies, can activate selectively the uncoupling protein family who exists in the white fat cells and skeletal muscle of the part, produces heat, and it can be made to be able to radiate heat, and can carry out the lean figure of the part which gave the stimulus selectively.

[0025]The physical stimulation means of a lean figure instrument gives physical stimulation at least to the scapula lower part, the regio axillaris, and one of the back cervixes selectively, stimulates the uncoupling protein family of a brown fat cell, and can be activated. Thus, if physical stimulation of the brown fat cell is carried out, activate the uncoupling protein family of the whole body, and heat is produced, and heat can be made to be able to radiate, and the lean figure of the whole body can be carried out.

[0026]A physical stimulation means by which a lean figure instrument stimulates selectively the uncoupling protein family of a part who wants to become thin as mentioned above here, A physical stimulation means to stimulate selectively at least one of the uncoupling protein families of the brown fat cell which exists in the scapula lower part, the regio axillaris, and a back cervix at least as mentioned above can be formed as what it has.

[0027]A physical stimulation means by which a lean figure instrument stimulates selectively the uncoupling protein family of a part who wants to become thin as mentioned above at this time, It has a physical stimulation means to stimulate selectively at least one of the uncoupling protein families of the brown fat cell which exists in the scapula lower part, the regio axillaris, and a back cervix at least as mentioned above, and can also form as what stimulated the body simultaneously by each physical stimulation means. The thing which gives the physical stimulation of a different kind, or any may be sufficient also as the thing which gives the same kind of physical stimulation as each of this physical stimulation means.

[0028]A physical stimulation means by which a lean figure instrument stimulates selectively the uncoupling protein family of a part who wants to become thin as mentioned above, It has a physical stimulation means to stimulate selectively at least one of the uncoupling protein families of the brown fat cell which exists in the scapula lower part, the regio axillaris, and a back cervix at least as mentioned above, After stimulating by a physical stimulation means to stimulate selectively the uncoupling protein family of a part who wants to become thin, In predetermined time, it can also form as what stimulates by a physical stimulation means to stimulate selectively at least one of the uncoupling protein families of the brown fat cell which exists in the scapula lower part, the regio axillaris, and a back cervix at least. As for the inside of predetermined time, about less than 30 minutes is preferred here.

[0029]In this case, in using two physical stimulation means together, two things which became independent as each physical stimulation means are used, After stimulating the uncoupling protein family of a part who wants to become thin by one physical stimulation means, It may be made to stimulate the uncoupling protein family of the brown fat cell which exists in the scapula lower part, regio axillaris, a back cervix, etc. by the physical stimulation means of another side, Or after stimulating the uncoupling protein family of a part who wants to become thin by this physical stimulation means only using one physical stimulation means, it may be made to

stimulate the uncoupling protein family of the brown fat cell which exists in the scapula lower part, regio axillaris, a back cervix, etc. by this same physical stimulation means.

[0030]As mentioned above, stimulate selectively the uncoupling protein family of a part who wants to become thin, and. By stimulating selectively at least one of the uncoupling protein families of the brown fat cell which exists in the scapula lower part, regio axillaris, a back cervix, etc., The lean figure of the part which wants to become thin can be carried out preponderantly, attaining the whole body lean figure by activation of the uncoupling protein family of a brown fat cell.

[0031]

[Example]Next, working example explains this invention.

[0032](**Working example 1**) The lean figure instrument A possessing this ultrasonic irradiation implement 1 was formed using the ultrasonic irradiation implement 1 which irradiates with an ultrasonic wave as a physical stimulation means on condition of 1-3 MHz and  $1\text{W}/\text{cm}^2$  and the surface of the part where the body 4 wants to become thin as shown in drawing 1 -- the ultrasonic irradiation implement 1 -- \*\* -- it irradiated with the ultrasonic wave. At this time, it is preferred to apply gel to the part which irradiates with an ultrasonic wave as the ultrasonic transmission medium 3. This gel is the same as what is used by the usual ultrasonic diagnosis, for example, it is the thing of hydrophilic nature which made water hold to carboxymethyl cellulose. And the ultrasonic wave irradiated from the ultrasonic irradiation instrument 1 reaches to the fat and intramuscular in the body through the ultrasonic transmission medium 3, and the uncoupling protein family of a fat or intramuscular is stimulated by an ultrasonic wave, and is activated, and it can acquire the lean figure effect of a site of the stimulus.

[0033]Here, the example of an experiment for checking the lean figure effect when it irradiates with an ultrasonic wave and physical stimulation is given is shown. First, activation of an uncoupling protein family's UCP3 when the leg of a rat is irradiated with the ultrasonic wave of 1 MHz and  $1\text{W}/\text{cm}^2$  for 20 minutes was measured. A result is shown in drawing 2. Drawing 2 measures and shows the activity of UCP3 of the leg skeleton muscle of the group of the activity of UCP3 of the leg skeleton muscle of the group of six rats which do not irradiate with an ultrasonic wave, and six rats immediately after irradiating with an ultrasonic wave, and the activity of UCP3 of the leg skeleton muscle of the group of six rats 3 hours after ultrasonic irradiation.

It is checked that UCP3 is intentionally activated by the physical stimulation by an ultrasonic wave.

Next, skinfold thickness weight when continuous irradiation of the ultrasonic wave of 1 MHz and  $1\text{W}/\text{cm}^2$  was carried out to the leg of the rat for four weeks for 10 minutes for 5 minutes or every day every day was measured. A result is shown in drawing 3. The fat weight of the group of four rats which drawing 3 does not irradiate with an ultrasonic wave, and the fat weight of the group of four rats which irradiated with the ultrasonic wave for 5 minutes every day, The fat weight of the group of four rats which irradiated with the ultrasonic wave for 10 minutes every day is measured and shown, fat weight is falling intentionally by the physical stimulation by an ultrasonic wave, and it is checked that there is the lean figure effect.

[0034](**Working example 2**) The ultrasonic irradiation implement 1 which irradiates with an

ultrasonic wave on condition of 1-3 MHz and  $1 \text{ W/cm}^2$  as a physical stimulation means, The lean figure instrument A which possesses this ultrasonic irradiation implement 1 and the low frequency wave oscillation implement 2 using the low frequency wave oscillation implement 2 which outputs the low frequency wave electrical and electric equipment on conditions (1-1000 Hz and 5 mA or less) as a physical stimulation means was formed. And as shown in drawing 4, the ultrasonic stimulus or more of one in the scapula lower part 5 of the body, the regio axillaris 7, and the back cervix 6 was carried out using the ultrasonic irradiation implement 1, and the uncoupling protein family in a brown fat cell was activated. Simultaneously with this, less than 30 minutes afterward, the low frequency wave stimulus of the part and the leg 8 which want to become thin with the low frequency wave oscillation implement 2 was carried out, and the uncoupling protein family in white fat cells and skeletal muscle was activated. Thus, partial lean figure and whole body lean figure were attained.

[0035]The ultrasonic irradiation implement 1 and the low frequency wave oscillation implement 2 can carry out physical stimulation of two or more places using plurality. After stimulating one or more places of the scapula lower part 5, the regio axillaris 7, and the back cervix 6 and activating the uncoupling protein family in a brown fat cell only using one side of the ultrasonic irradiation implement 1 and the low frequency wave oscillation implement 2, One or more parts which want to become thin are stimulated, and it may be made to activate the uncoupling protein family in white fat cells and skeletal muscle.

[0036](**Working example 3**) The lean figure instrument A possessing this ultrasonic irradiation implement 1 was formed using the ultrasonic irradiation implement 1 which irradiates with an ultrasonic wave on condition of 1-3 MHz and  $1 \text{ W/cm}^2$  as a physical stimulation means. And as shown in drawing 5, the ultrasonic stimulus of the part where the body wants to become thin, and the leg 8 was carried out. At this time, the white fat cells and skeletal muscle of a part which want to become thin will be stimulated, promotion of lipolysis and an uncoupling protein family's activation can be performed simultaneously, and the partial lean figure effect of a part of liking to become thin can be acquired.

[0037]The ultrasonic irradiation implement 1 is made into plurality, and it may be made to give a stimulus simultaneously to two or more parts which want to become thin.

[0038]

**[Effect of the Invention]** The lean figure instrument which starts Claim 1 of this invention as mentioned above, Since you stimulate physically the uncoupling protein family who considers a heat production as work, and you make it activated and the physical stimulation means for making heat produce and radiate heat is provided, by physical stimulation, an uncoupling protein family can be activated effectively and lean figure can be carried out efficiently.

[0039]To the part which gives a stimulus, since the inventions of Claim 2 are an ultrasonic wave, high frequency, medium frequency, a low frequency wave, vibration, warm temperature, cooling, the electrical and electric equipment, \*\*, and a thing on which massage, and rub and at least one of the beats is made to act, the above-mentioned physical stimulation means, By such physical stimulation, an uncoupling protein family can be activated effectively and lean figure can be carried out efficiently.

[0040]The invention of Claim 3 the above-mentioned physical stimulation means, Since at least



one of the uncoupling protein families who exist in the brown fat cell, white fat cells, and skeletal muscle which exist in the scapula lower part, the regio axillaris, and a back cervix at least is stimulated, You can make it activated effectively and the lean figure of the uncoupling protein family who exists in a brown fat cell, white fat cells, and skeletal muscle can be carried out efficiently.

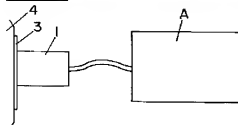
[0041]Since the uncoupling protein family of a part who wants to become thin is stimulated selectively, the above-mentioned physical stimulation means can activate effectively the uncoupling protein family of a part who wants to become thin, and can carry out the partial lean figure of the invention of Claim 4 efficiently.

[0042]In the invention of Claim 5, the above-mentioned physical stimulation means stimulates selectively at least one of the uncoupling protein families of the brown fat cell which exists in the scapula lower part, the regio axillaris, and a back cervix at least.

Therefore, by the physical stimulation of a brown fat cell, the uncoupling protein family of the whole body can be activated and whole body lean figure can be carried out efficiently.

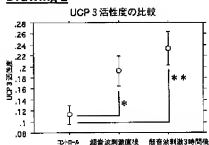
## DRAWINGS

**Drawing 1**

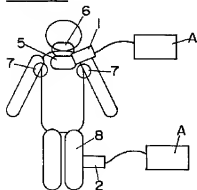


1…超音波探射具  
A…減速器具

**Drawing 2**

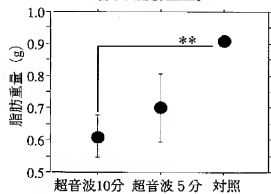


**Drawing 4**

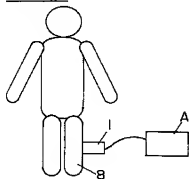


**Drawing 3**

《皮下脂肪重量》



**Drawing 5**



**Drawing 6**

遊離脂肪酸

